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(54) **BIKE SADDLE INCORPORATING WITH BIO-GEL STRUCTURE**

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B62J 1/00	(2006.01)
B32B 5/18	(2006.01)
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B32B 27/40	(2006.01)
B32B 7/12	(2006.01)

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(58) **Field of Classification Search**

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USPC 297/214

See application file for complete search history.

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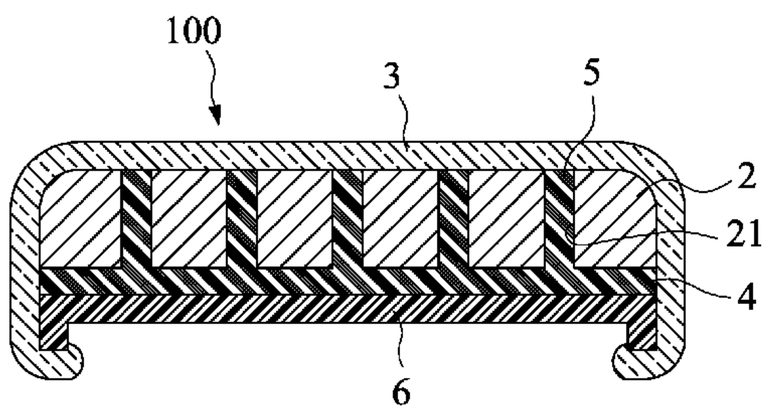
(57) **ABSTRACT**

A bike saddle incorporating a bio-gel structure includes, arranged in a saddle, a foam material layer and a surface layer set on and covering a surface of the foam material layer. A plurality of spaced through holes is formed in the foam material layer. A bio-gel layer is formed on an under-surface of the foam material layer. A plurality of bio-gel blocks are respectively filled in the through holes of the foam material layer. Each of the bio-gel blocks has a top end in contact with an underside of the surface layer and a bottom end integrally connected with the bio-gel layer. The bio-gel layer provides a rider with comfortable riding experience and also achieves an antibacterial effect.

8 Claims, 4 Drawing Sheets



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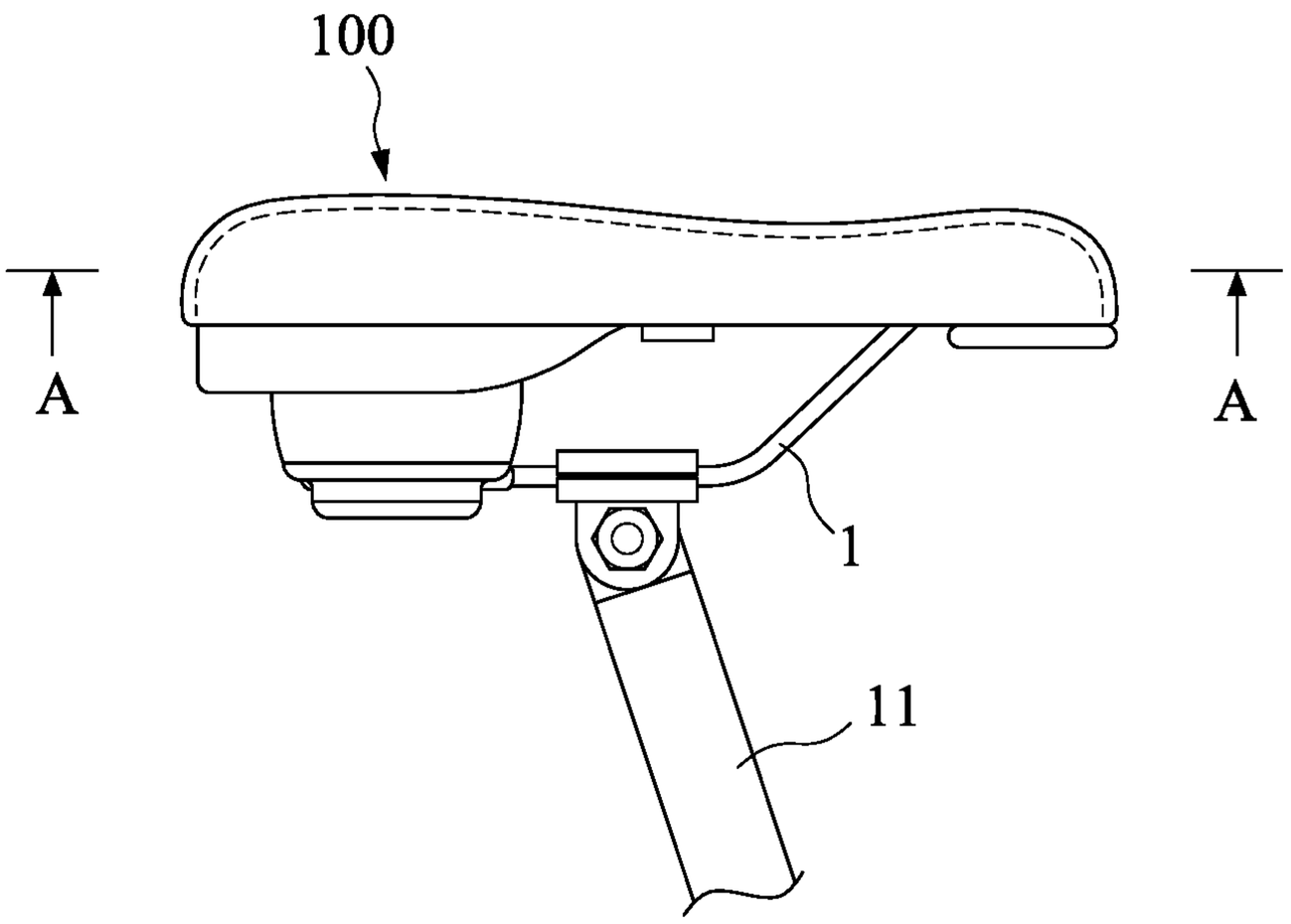

FIG.1

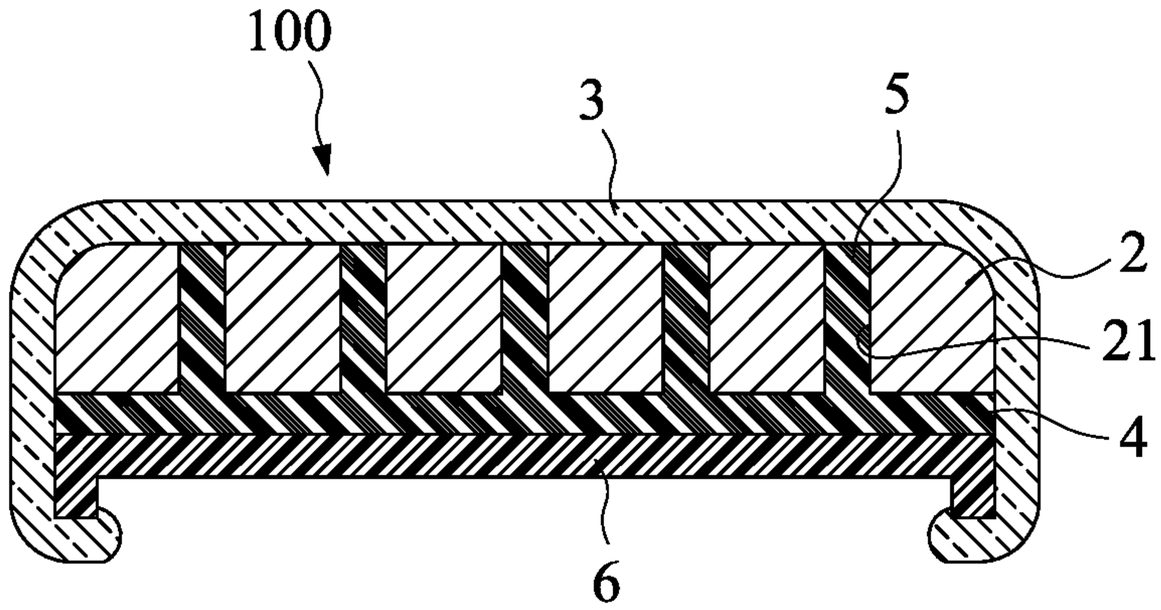

FIG.2

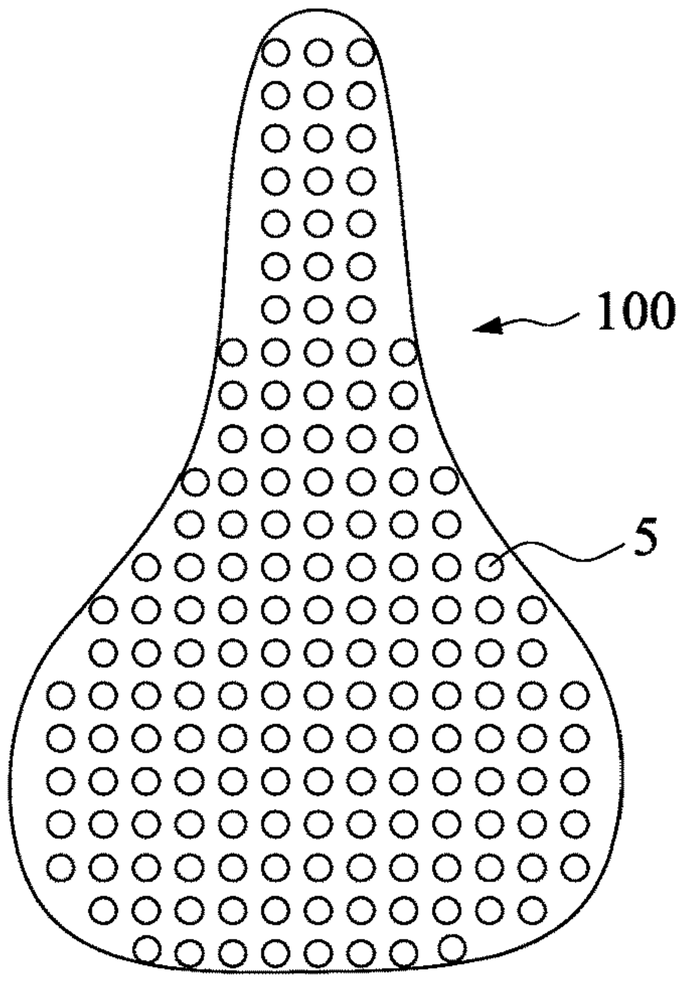

FIG.3

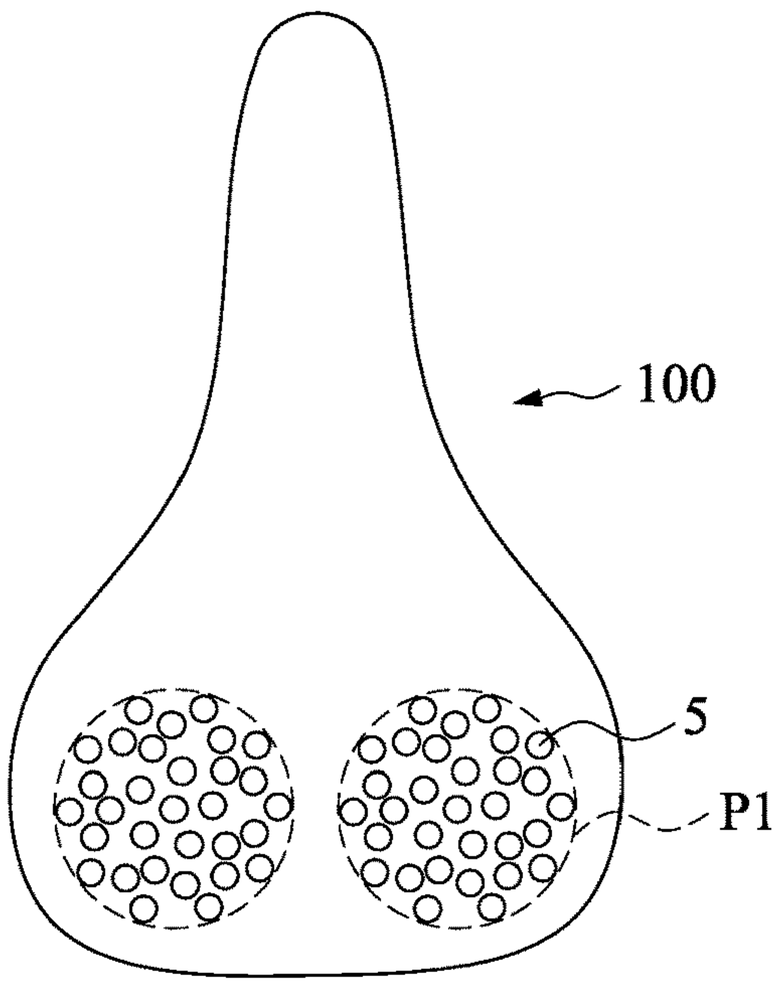

FIG.4

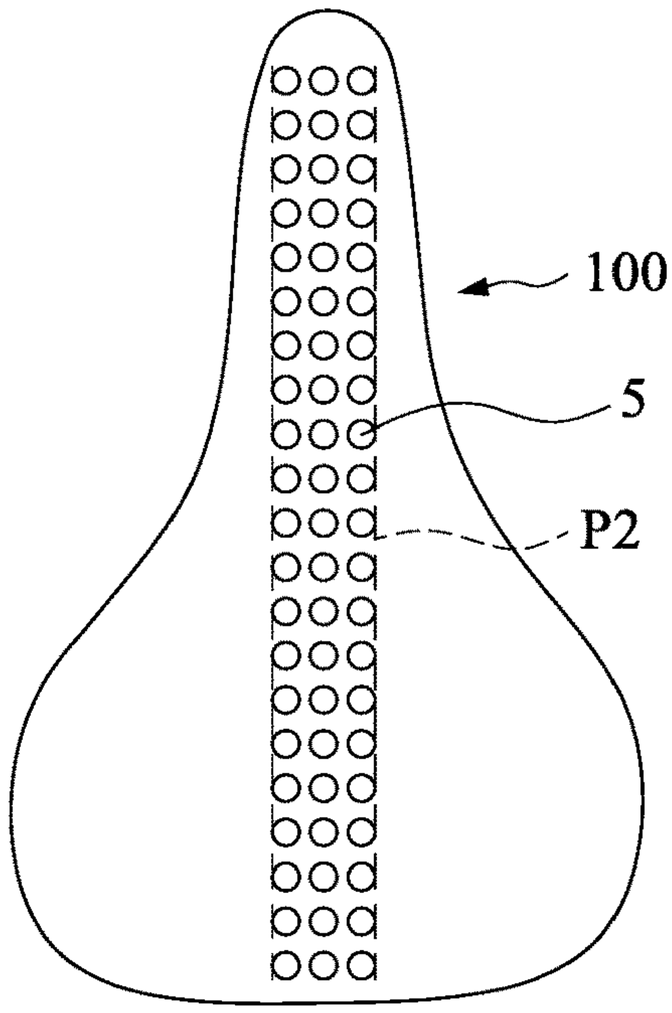

FIG.5

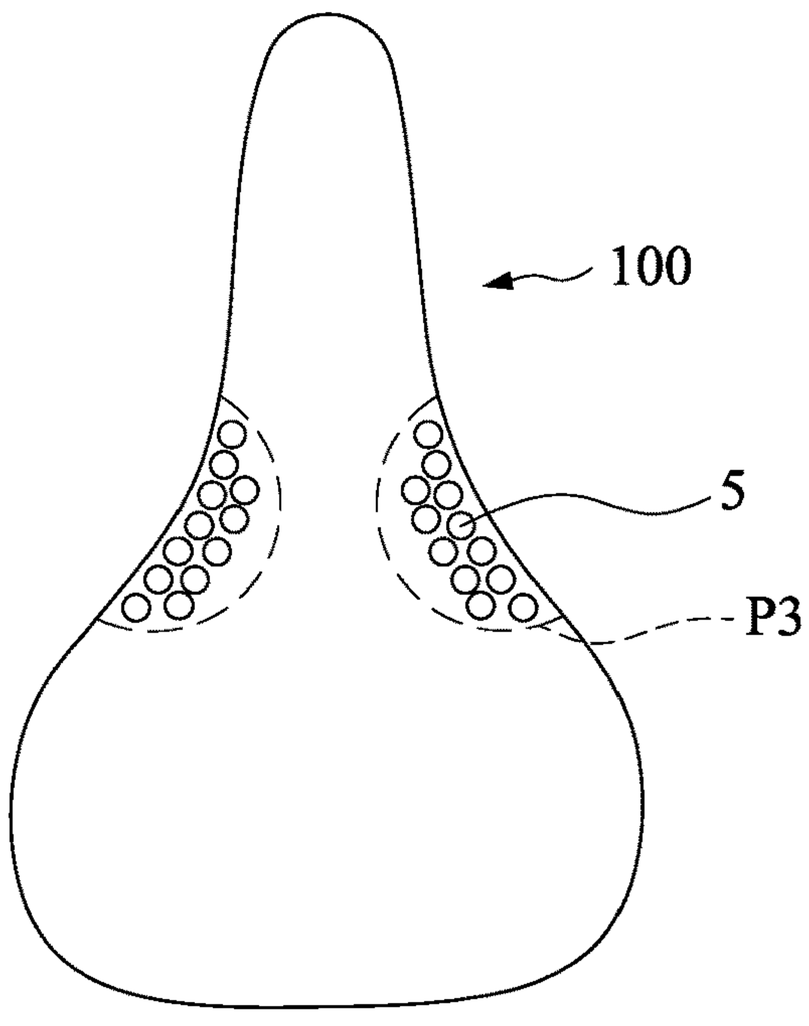

FIG.6

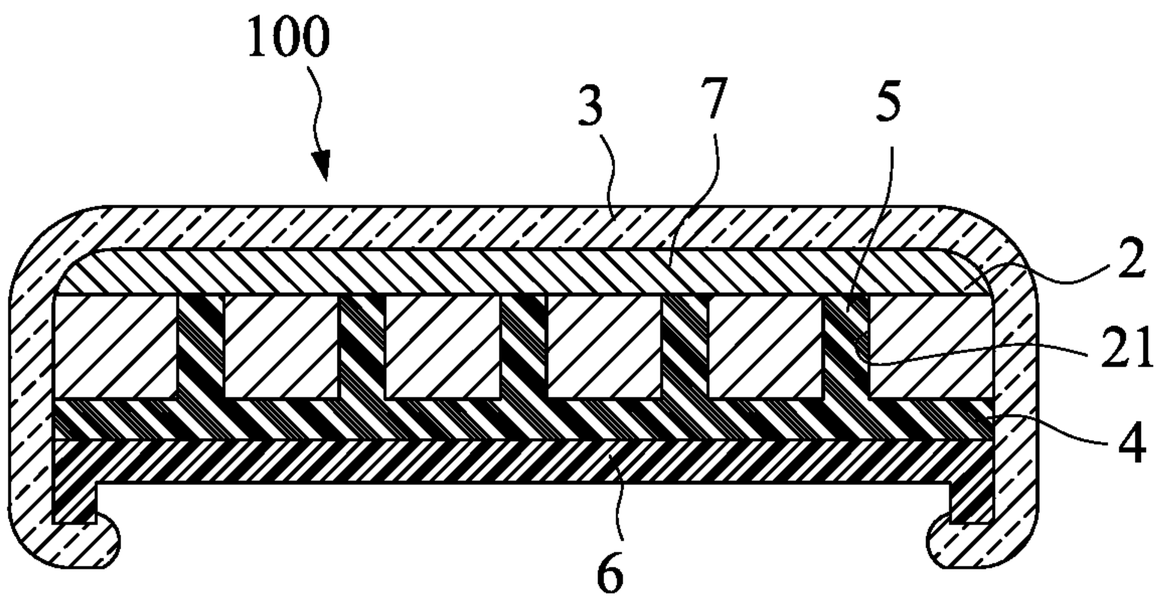

FIG.7

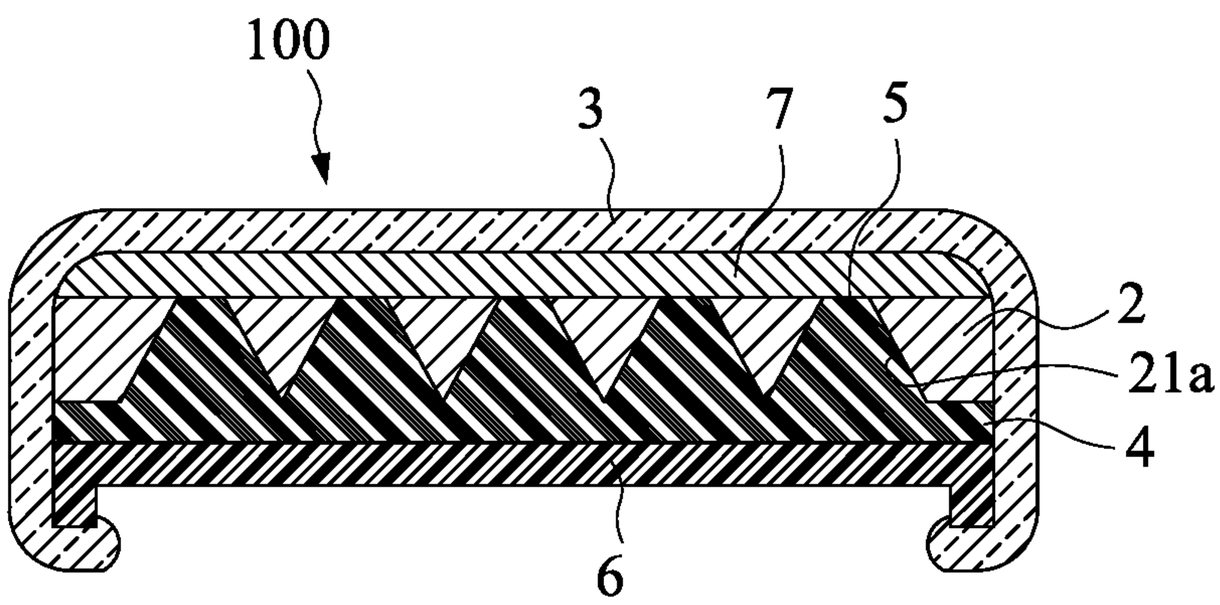

FIG.8

BIKE SADDLE INCORPORATING WITH BIO-GEL STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a saddle structure, and in particular to a bike saddle incorporating a bio-gel structure.

2. The Related Arts

In the known structure designs of saddle or seat cushion of bicycle or electrical vehicle, to protect a user from undertaking much vibration and vibration in riding a bicycle or an electrical vehicle and to improve riding comfortableness, it is common to provide a foamed material layer, a sponge layer, a memory foam layer, or other flexible or soft material that is mounted to the underside of the saddle or seat cushion in order to absorb a part of the vibration and shock. In a different product design, a gel layer in the form of an entire span of solid material is provided in the saddle or seat cushion to serve as a material for absorbing vibration and shock.

However, issues of damping and mold growth, bacterium breeding, and odor smell often occur with the cushion material after the saddle or seat cushion have been used for a while. Heretofore, no solution has been proposed to effectively handle such issues. Further, using the gel layer in the form of an entire span of solid material may undesirably increase the overall weight of the saddle or seat cushion. In addition, such an entire span of gel material is generally adverse to ventilation and cooling on the side in direct contact with a human body.

SUMMARY OF THE INVENTION

In view of the above, the primary objective of the present invention is to provide a bike saddle incorporating with a bio-gel structure, which is desired to provide improved comfortableness of use of a saddle of a bicycle or an electrical vehicle and also to achieve an antibacterial effect.

To achieve the above objective, the present invention comprises, arranged in a saddle, a foam material layer and a surface layer set on and covering a surface of the foam material layer. A plurality of spaced through holes are formed in the foam material layer. A bio-gel layer is formed on an undersurface of the foam material layer. A plurality of bio-gel blocks are respectively filled in the plurality of through holes of the foam material layer. Each of the bio-gel blocks has a top end in contact with an underside of the surface layer and a bottom end integrally connected with the bio-gel layer.

Compared to the traditional one-piece design of gel layer, the present invention provides a structural design that helps reduce the product weight and offers an excellent effect of ventilation when a rider is sitting on the saddle.

The structure of the present invention provides important features of the bio-gel layer in respect of flexibility, air breathing, and vibration absorption. In other words, the present invention provides a saddle that features capability of suppressing bacteria breeding, providing an effect of excellent regional blood circulation of the rider, and featuring proper flexibility and softness, cooling, and ventilation.

In the present invention, the bio-gel blocks could be distributed in for example an entire area of the saddle or in regional portions corresponding to ischium pressure supporting zones, leg contact zones, or a central line connection zone, so that the present invention provides an effect of stress release in regional area for a rider riding a vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be apparent to those skilled in the art by reading the following description of preferred embodiments of the present invention, with reference to the attached drawings, in which:

FIG. **1** is a side elevational view showing a bike saddle incorporating with a bio-gel structure according to a first embodiment of the present invention;

FIG. **2** is a cross-sectional view taken along line A-A of FIG. **1**;

FIG. **3** is a schematic view illustrating a first example of distribution of bio-gel blocks in a saddle according to the present invention;

FIG. **4** is a schematic view illustrating a second example of distribution of bio-gel blocks in a saddle according to the present invention;

FIG. **5** is a schematic view illustrating a third example of distribution of bio-gel blocks in a saddle according to the present invention;

FIG. **6** is a schematic view illustrating a fourth example of distribution of bio-gel blocks in a saddle according to the present invention;

FIG. **7** is a cross-sectional view showing a bike saddle incorporating with a bio-gel structure according to a second embodiment of the present invention; and

FIG. **8** is a cross-sectional view showing a bike saddle incorporating with a bio-gel structure according to a third embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring collectively to FIGS. **1-2**, a side elevational view is provided to illustrate a bike saddle incorporating a bio-gel structure according to the present invention, wherein FIG. **2** is a cross-sectional view taken along line A-A of FIG. **1**. As shown in the drawings, a saddle **100** has a bottom to which a support frame **1** is mounted. The support frame **1** is coupled to a vertical post **11**. The saddle **100** can be a saddle or seat cushion for use in a bicycle, an electrical vehicle, an automobile, or other applications.

As shown in FIG. **2**, the saddle **100** generally comprises a foam material layer **2** and a surface layer **3** set on and covering a surface of the foam material layer **2**. The foam material layer **2** is made of a material selected among polyurethane (PU), ethylene vinyl acetate (EVA), polypropylene (PP), thermoplastic rubber (TRP), and polyvinyl chloride (PVC).

The foam material layer **2** can also be made of thermoplastic polyurethane (TPU). The material is formed of a plurality of foam units that are arranged such that multiple ones of the foam unites are adhesively bonded together with an adhesive material or adjacent ones of the foam units are connected together through fusion of surfaces of the foam units with heat. Each of the foam units is formed through a foaming process such that multiple pores are formed, through foaming, in the interior thereof so that a material layer that features lightweight and high elasticity is formed.

In the structural arrangement of the present invention, the foam material layer **2** is formed therein with a plurality of through holes **21** that are spaced from each other. Each of the through holes **21** is structured as a columnar or cylindrical

hole, meaning a bottom opening and a top opening of each of the through holes **21** have the same diameter.

A bio-gel layer **4** is formed on an undersurface of the foam material layer **2**. A plurality of bio-gel blocks **5** are respectively filled in the plurality of through holes **21** formed in the foam material layer **2**. Each of the bio-gel blocks **5** has a top end in contact with and supporting an underside of the surface layer **3** and a bottom end integrally connected with the bio-gel layer **5**.

The bio-gel layer **4** and the bio-gel blocks **5** are each an elastic body formed of a gel material. For example, the gel material can be a polyurethane-based gel, a silicone-based gel, a PVC-based gel, or an acrylic-based gel.

In this invention, the gel material that makes the bio-gel layer **4** and the bio-gel blocks **5** is added with or coated and covered with an antibacterial material. The antibacterial material may include antibacterial microorganisms, so that a volatile compound generated by the antibacterial microorganisms may provide effects, through air, to suppress growth of bacteria and decompose odor smell.

Further, the antibacterial material may for example include nanoparticles of silver. The silver nanoparticles are added in the bio-gel layer **4** and the bio-gel blocks **5** or are coated as a surface layer of the bio-gel blocks **5**. The silver nanoparticles also provide an antibacterial effect.

Further, the antibacterial material may for example include a far infrared ceramic material or a far infrared nanomaterial so as to provide the bio-gel blocks **5** with an effect of emission of far infrared radiation and releasing negative ions. When bacteria live in the saddle, the infrared radiation may weaken activity of the bacteria and the negative ions, when absorbed by the bacteria, may cause death of the bacteria. When the body of a rider is put in contact with the far infrared emission bio-gel blocks, an effect of prompting regional blood circulation may be acquired.

The above-described structure of the saddle can be arranged in the form as an envelope or cover of the saddle in order to fit over the surface of an existing bike saddle. Alternatively, a bottom material **6** may be directly mounted to an undersurface of the foam material layer **2** for mounting to the support frame **1** shown in FIG. **1** for further coupling with the vertical post **11** to serve as a saddle of a bicycle.

FIG. **3** is a schematic view illustrating a first example of distribution of the bio-gel blocks in the saddle according to the present invention. As shown in the drawing, the entirety of the surface of the saddle **100** is provided with the through holes **21** in a manner of uniform distribution over the entire surface. In other words, the bio-gel blocks **5** are arranged to distribute in the entire area of the foam material layer **2**.

FIG. **4** is a schematic view illustrating a second example of distribution of the bio-gel blocks in the saddle according to the present invention. As shown in the drawing, the saddle **100** has two ischium pressure supporting zones P**1** that are areas respectively corresponding to the ischium bones of a rider sitting on the saddle. The plurality of bio-gel blocks **5** are arranged in the foam material layer **2** at portions corresponding to the ischium pressure supporting zones P**1**.

FIG. **5** is a schematic view illustrating a third example of distribution of the bio-gel blocks in the saddle according to the present invention. As shown in the drawing, the saddle **100** has a central line connection zone P**2** that is defined as a central area extending from a front end thereof to a rear. The plurality of bio-gel blocks **5** are arranged in the foam material layer **2** at a portion corresponding to the central line connection zone P**2**.

FIG. **6** is a schematic view illustrating a fourth example of distribution of the bio-gel blocks in the saddle according to the present invention. As shown in the drawing, the saddle **100** has regional areas that correspond to inner sides of thighs of a rider and are defined as leg contact zones P**3**. The plurality of bio-gel blocks **5** are arranged in the foam material layer **2** at portions corresponding to the leg contact zones P**3**.

FIG. **7** is a cross-sectional view showing a bike saddle incorporating with a bio-gel structure according to a second embodiment of the present invention. The instant embodiment is structured similar to the first embodiment and similar components and parts are designated with the same reference numerals for consistency. In the instant embodiment, a vibration absorbing material layer **7** is arranged between the foam material layer **2** and the surface layer **3**. For example, the vibration absorbing material layer **7** can be one of a memory foam layer or a foam or sponge layer. Memory foam is a material made of polyurethane polymer, featuring both viscosity and elasticity, so that when an external force causes the memory foam to undergo deformation, the memory foam may gradually restore in order to absorb the kinetic energy of impact.

FIG. **8** is a cross-sectional view showing a bike saddle incorporating with a bio-gel structure according to a third embodiment of the present invention. In the instant embodiment, the foam material layer **2** is formed, in an interior thereof, with a plurality of truncated-conic through holes **21***a*. Namely, the truncated-conic through holes **21***a* each have a top opening having a reduced diameter and a bottom opening having an enlarged opening. Alternatively, the truncated-conic holes **21***a* may be reversed truncated-conic through holes each having a bottom opening having a reduced diameter and a top opening having an enlarged diameter.

Although the present invention has been described with reference to the preferred embodiments thereof, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing from the scope of the present invention which is intended to be defined by the appended claims.

What is claimed is:

1. A bike saddle, comprising:

a foam material layer;

a surface layer set on and covering a surface of the foam material layer;

a plurality of spaced through holes formed in the foam material layer;

a bio-gel layer formed on an undersurface of the foam material layer; and

a plurality of bio-gel blocks respectively set and filled in the plurality of the through holes of the foam material layer, each of the bio-gel blocks having a top end in contact with an underside of the surface layer and a bottom end integrally formed with the bio-gel layer.

2. The bike saddle according to claim **1**, wherein the foam material layer has an undersurface comprising a bottom material mounted thereto.

3. The bike saddle according to claim **1**, wherein a vibration absorbing material layer is arranged between the foam material layer and the surface layer.

4. The bike saddle according to claim **1**, wherein the through holes are each structured as one of a cylindrical through hole and a truncated-conic through hole.

5. The bike saddle according to claim **1**, wherein the plurality of bio-gel blocks are distributed over an entire area of the foam material layer.

6. The bike saddle according to claim 1, wherein the saddle has two portions adapted correspond to ischium bones of a rider and defined as ischium pressure supporting zones, the plurality of bio-gel blocks being distributed in portions of the foam material layer that correspond to the ischium pressure supporting zones.

7. The bike saddle according to claim 1, wherein the saddle has portions adapted to correspond to inner sides of tights of a rider and defined as leg contact zones, the plurality of bio-gel blocks being distributed in portions of the foam material layer that correspond to the leg contact zones.

8. The bike saddle according to claim 1, wherein the saddle has a central area extending from a front end to a rear end and defined as a central line connection zone, the plurality of bio-gel blocks being distributed in a portion of the foam material layer that corresponds to the central line connection zone.

* * * * *